Reducing Cardiometabolic Risk in Practice

Leigh Perreault, MD
Associate Professor of Medicine
Division of Endocrinology, Metabolism and Diabetes
University of Colorado Anschutz Medical Campus

Can we prevent obesity?

Lessons from the NWCR

- Aware of the problem and ready to change
- Constant monitoring
- Long-term “diet”
- Exercise every day
- Major life changes

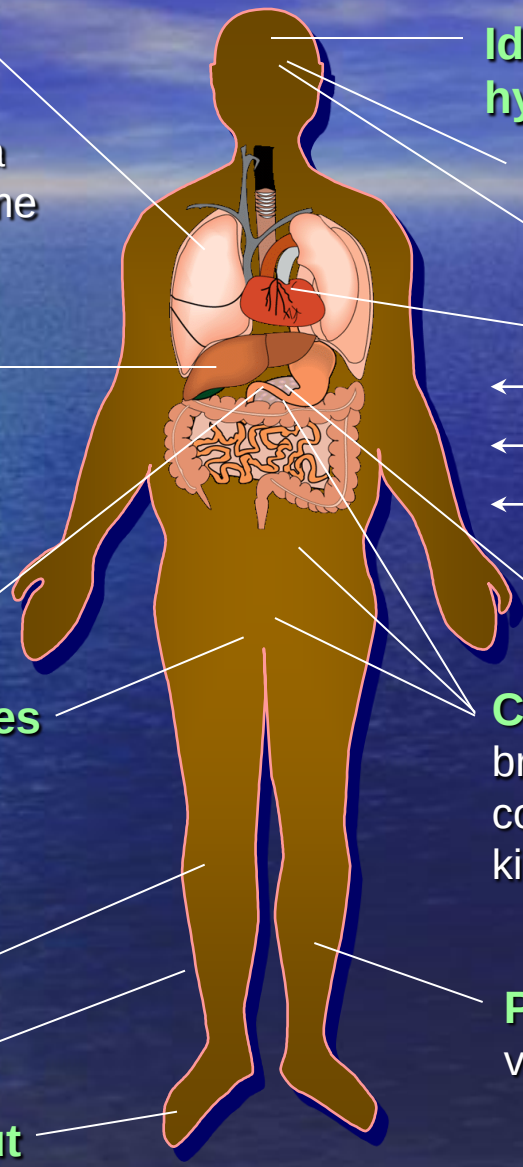
Diagnosis and Risk Stratification

Classification		BMI (kg/m^2)	Risk
Underweight		<18.5	Increased
Normal		18.5-24.9	Normal
Overweight		25.0-29.9	Increased
Obese	I	30.0-34.9	High
	II	35.0-39.9	Very High
	III	≥40	Extremely high

Additional risks:

- Large waist circumference (men>40 in; women >35 in)
- 5 kg or more weight gain since age 18-20 y
- Poor aerobic fitness
- Specific races and ethnic groups

Medical Complications of Obesity



Pulmonary disease
abnormal function
obstructive sleep apnea
hypoventilation syndrome

Nonalcoholic fatty liver disease
steatosis
steatohepatitis
cirrhosis

Gall bladder disease

Gynecologic abnormalities
abnormal menses
infertility
polycystic ovarian syndrome

Osteoarthritis

Skin

Gout

Idiopathic intracranial hypertension

Stroke

Cataracts

Coronary heart disease

Diabetes

Dyslipidemia

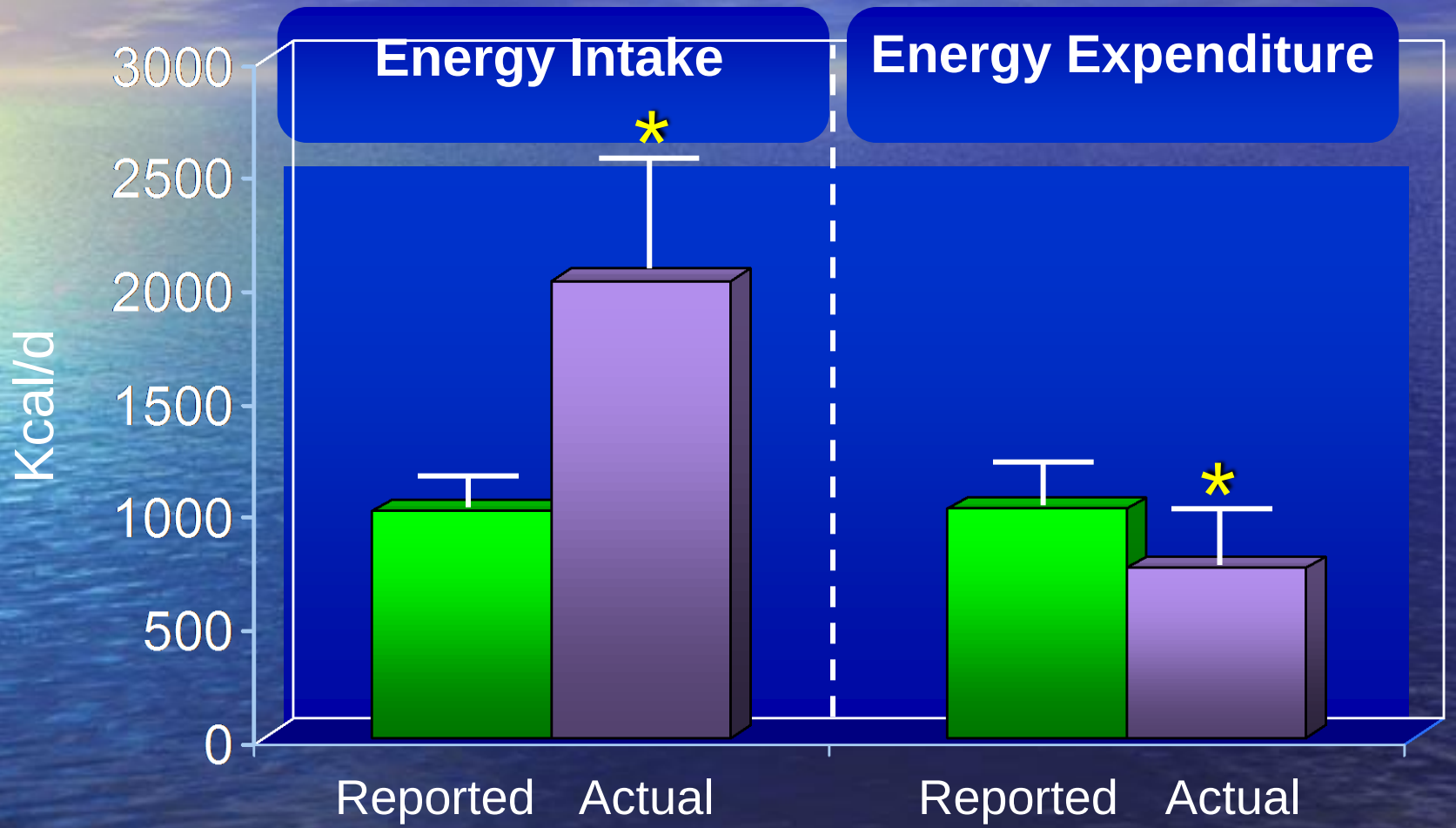
Hypertension

Severe pancreatitis

Cancer
breast, uterus, cervix
colon, esophagus, pancreas
kidney, prostate

Phlebitis
venous stasis

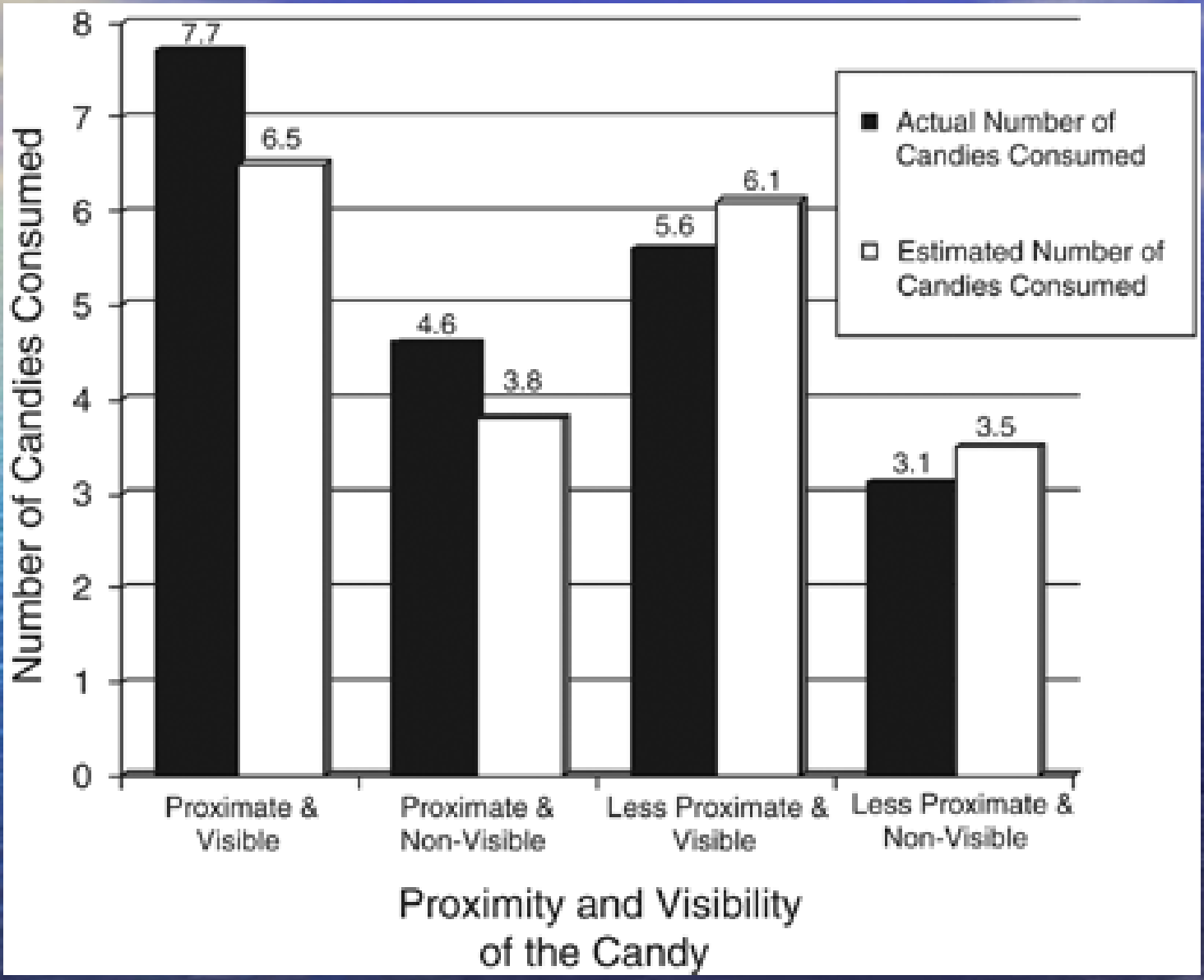
Discrepancy Between Reported and Actual Energy Intake and Expenditure



*P<0.05 vs reported.

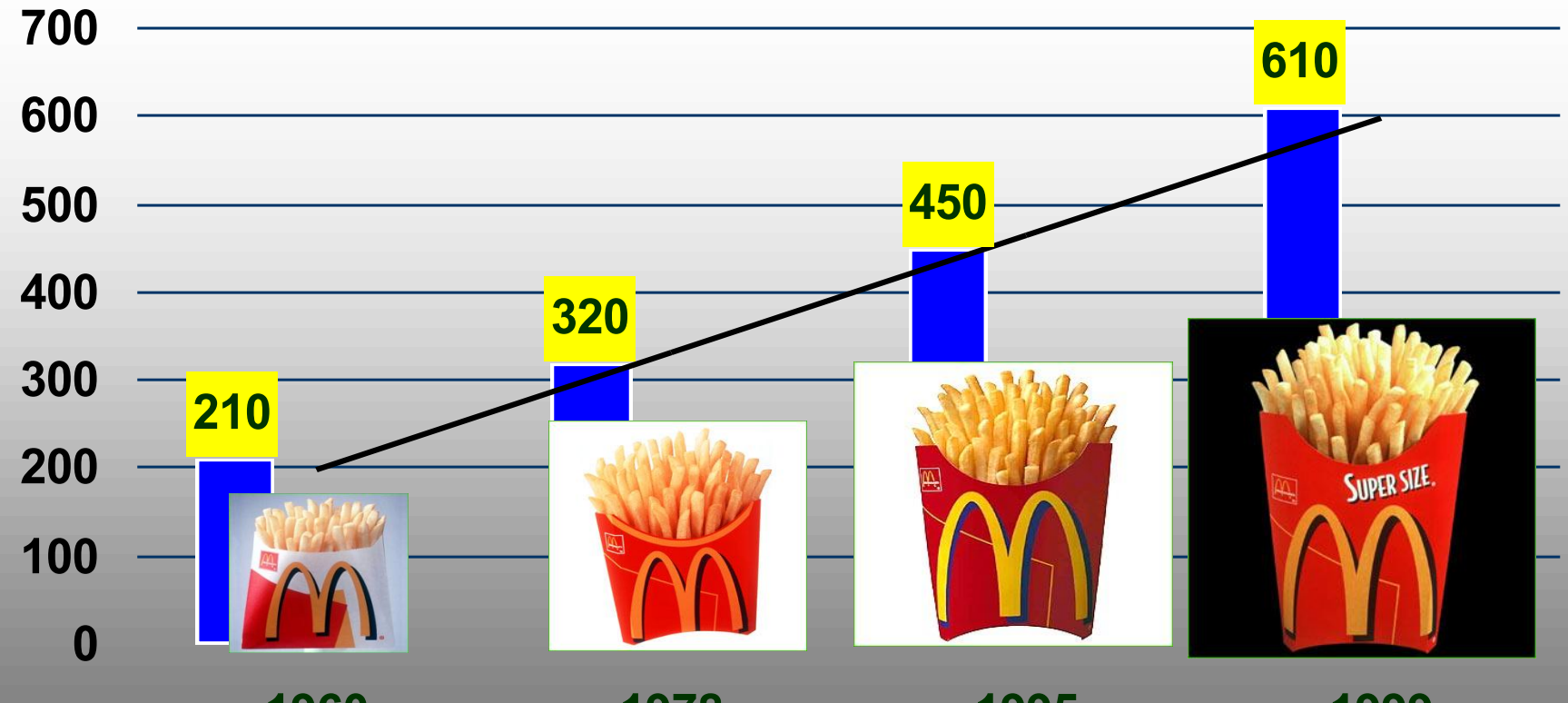
Lichtman et al. *N Engl J Med* 1992;327:1893.

Proximity & Visibility on Intake

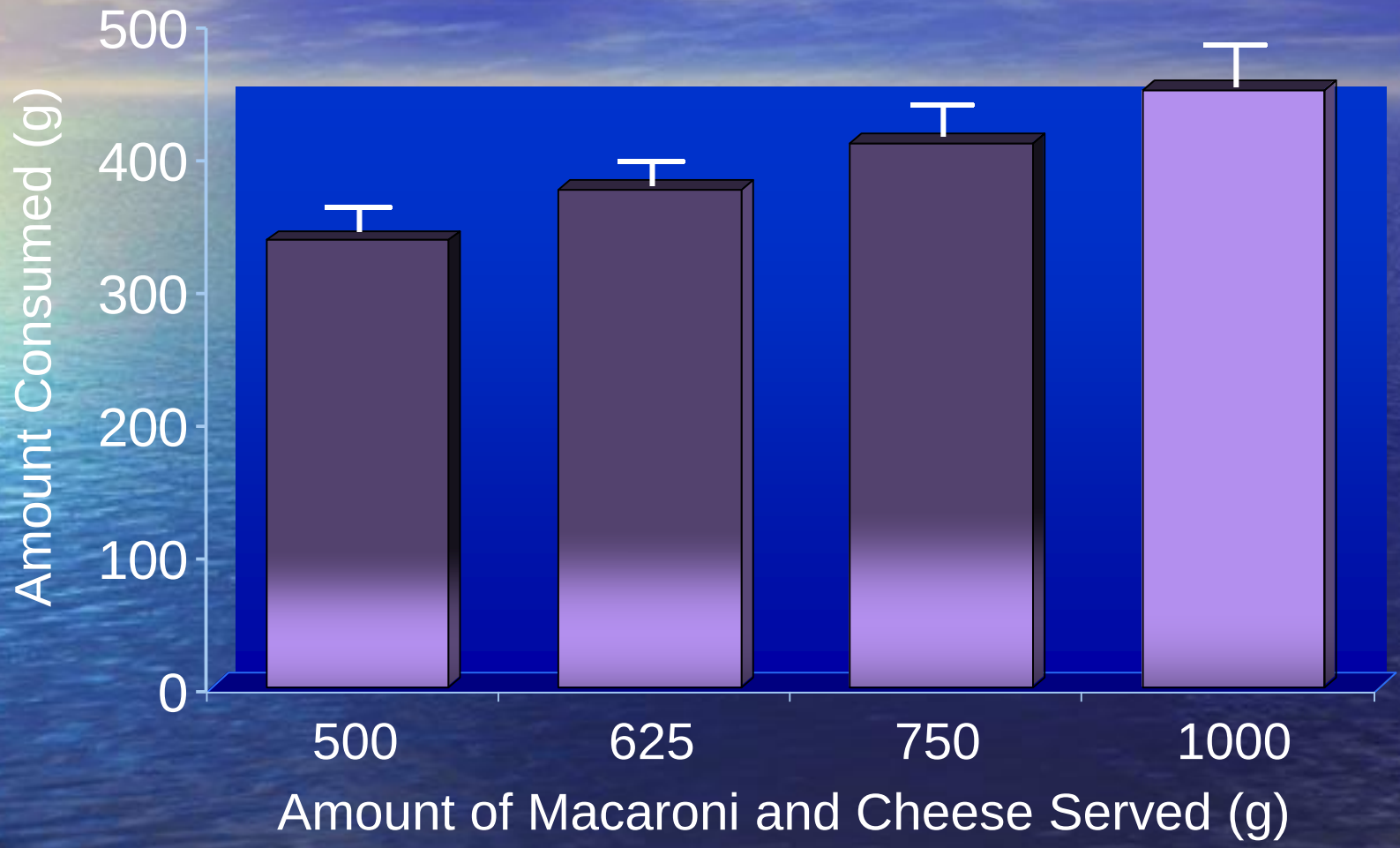


Wansink *Int J Obes* 2006

Portion Size



Effect of Portion Size on Energy Intake



Rolls et al. *Am J Clin Nutr*. 2000 Dec;76(6):1207-13.

Prescription for Total Daily Calories

12-20* kcal/lb = estimated daily calories to maintain weight

Activity factor (*AF): 12-13 sedentary
14-15 light activity
16-17 active
18-20 very active

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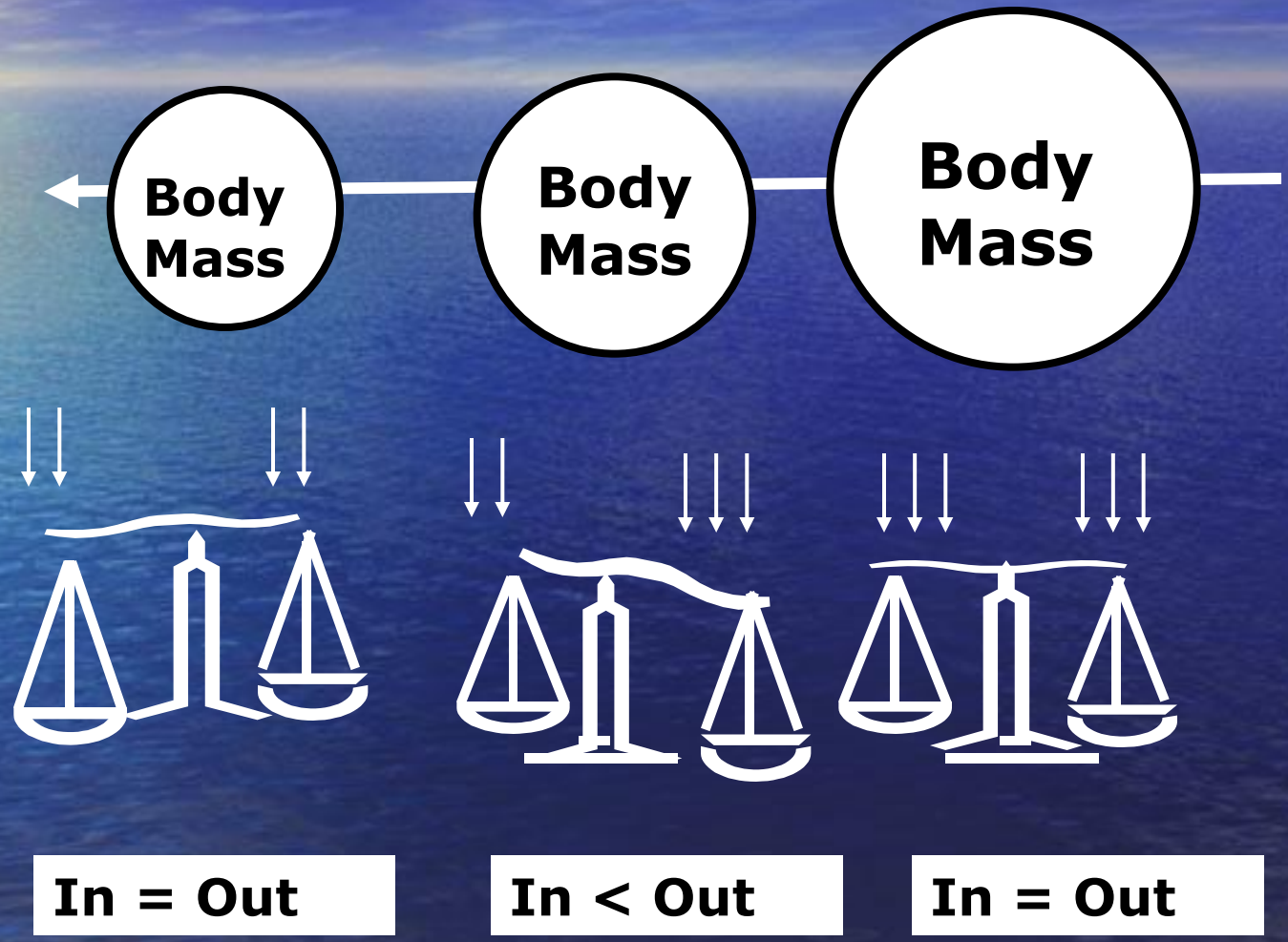
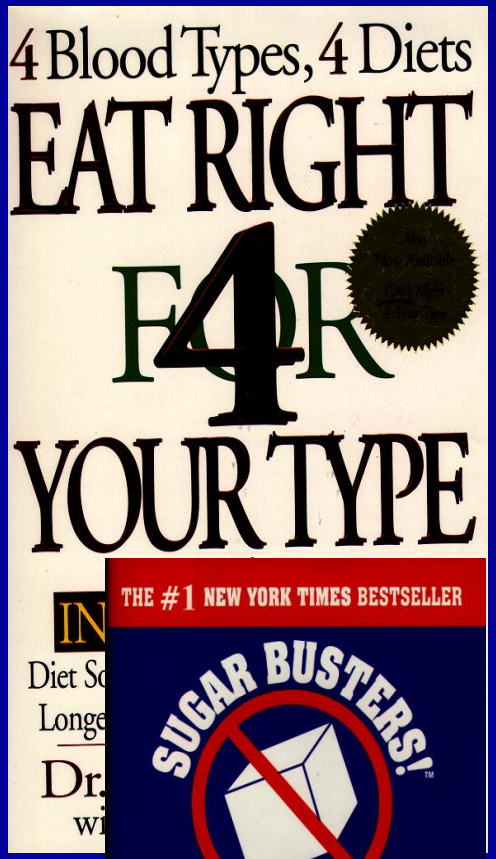
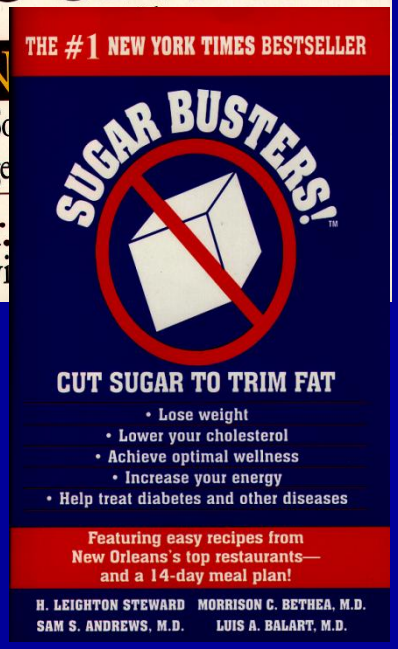
current daily calories – 500 = estimated daily calories to lose 1 lb per week

3500 kcal = 1 lb fat

What Happens With Weight Loss?




4 Blood Types, 4 Diets
EAT RIGHT
4
YOUR TYPE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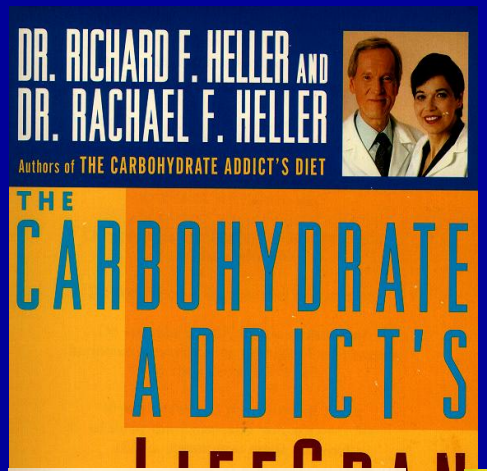
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DR. RACHAEL F. HELLER
Authors of THE CARBOHYDRATE ADDICT'S DIET
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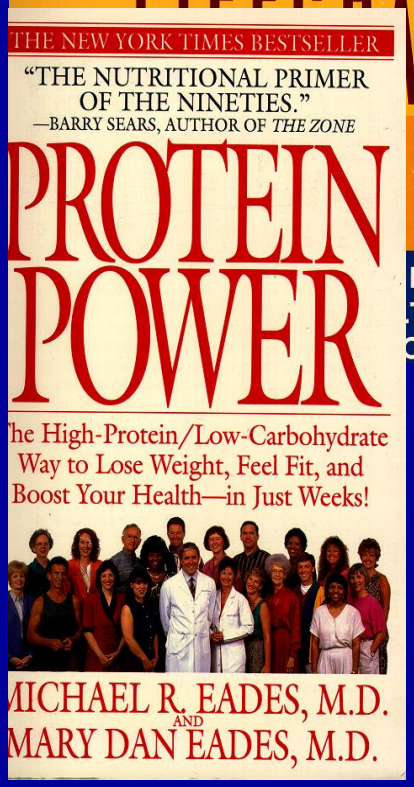
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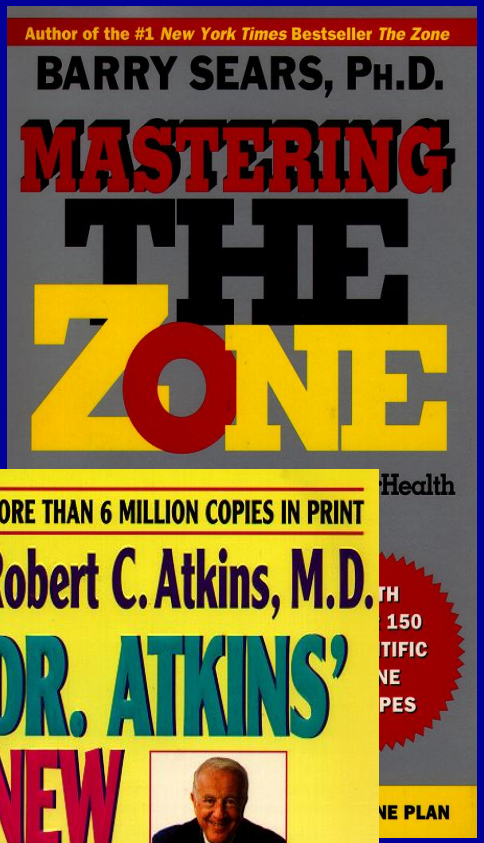
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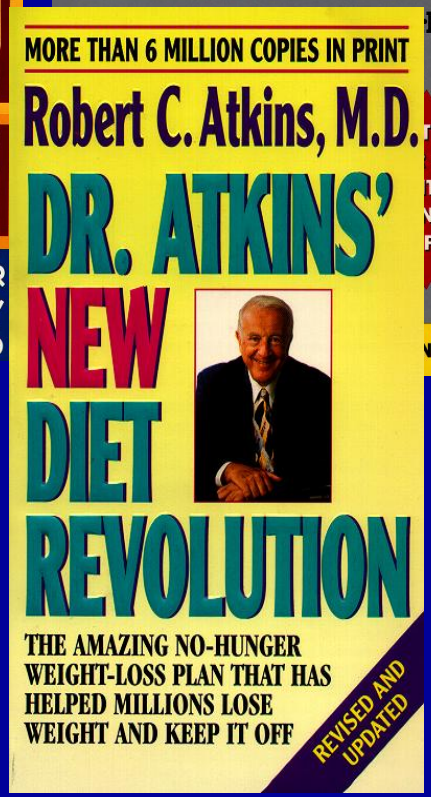
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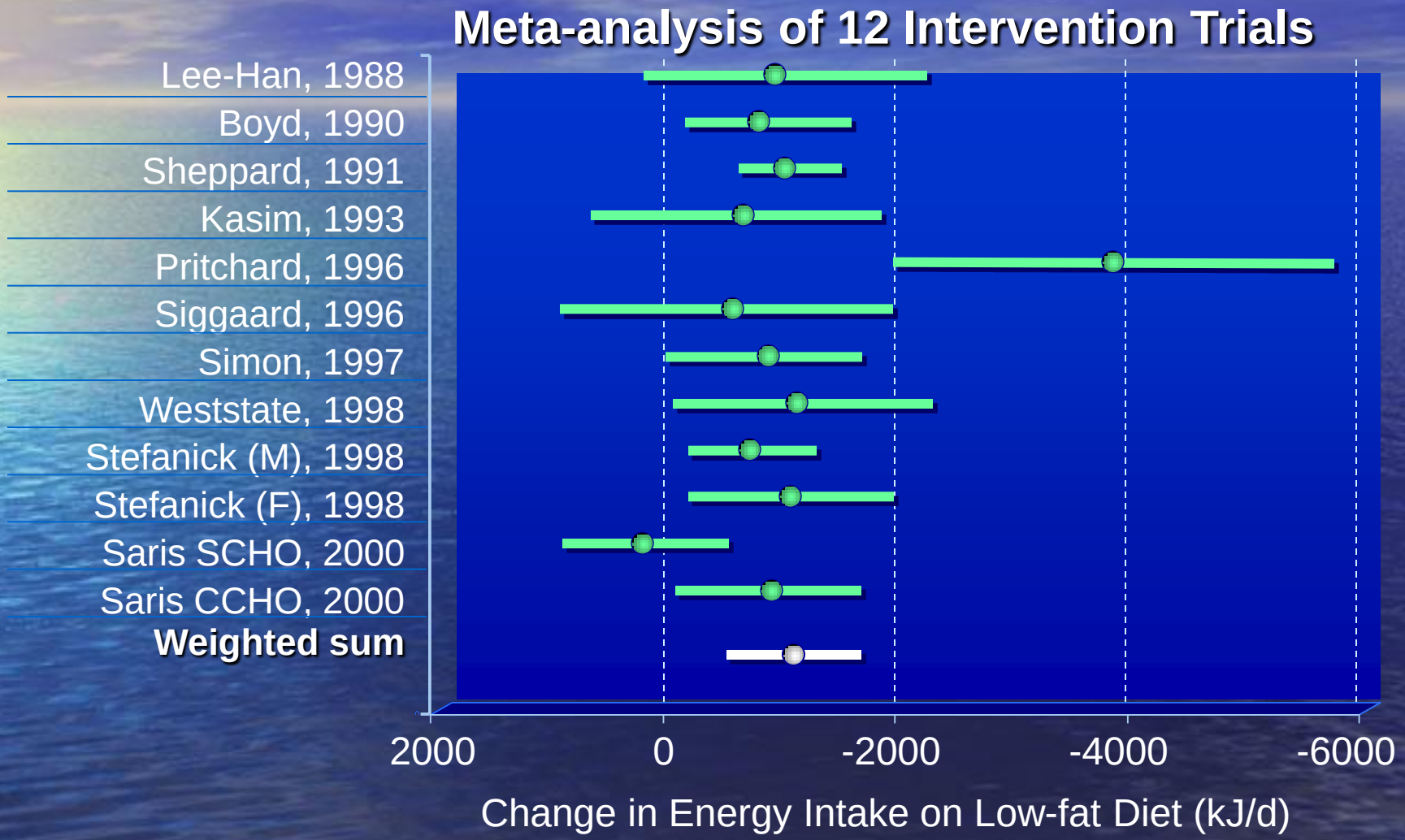
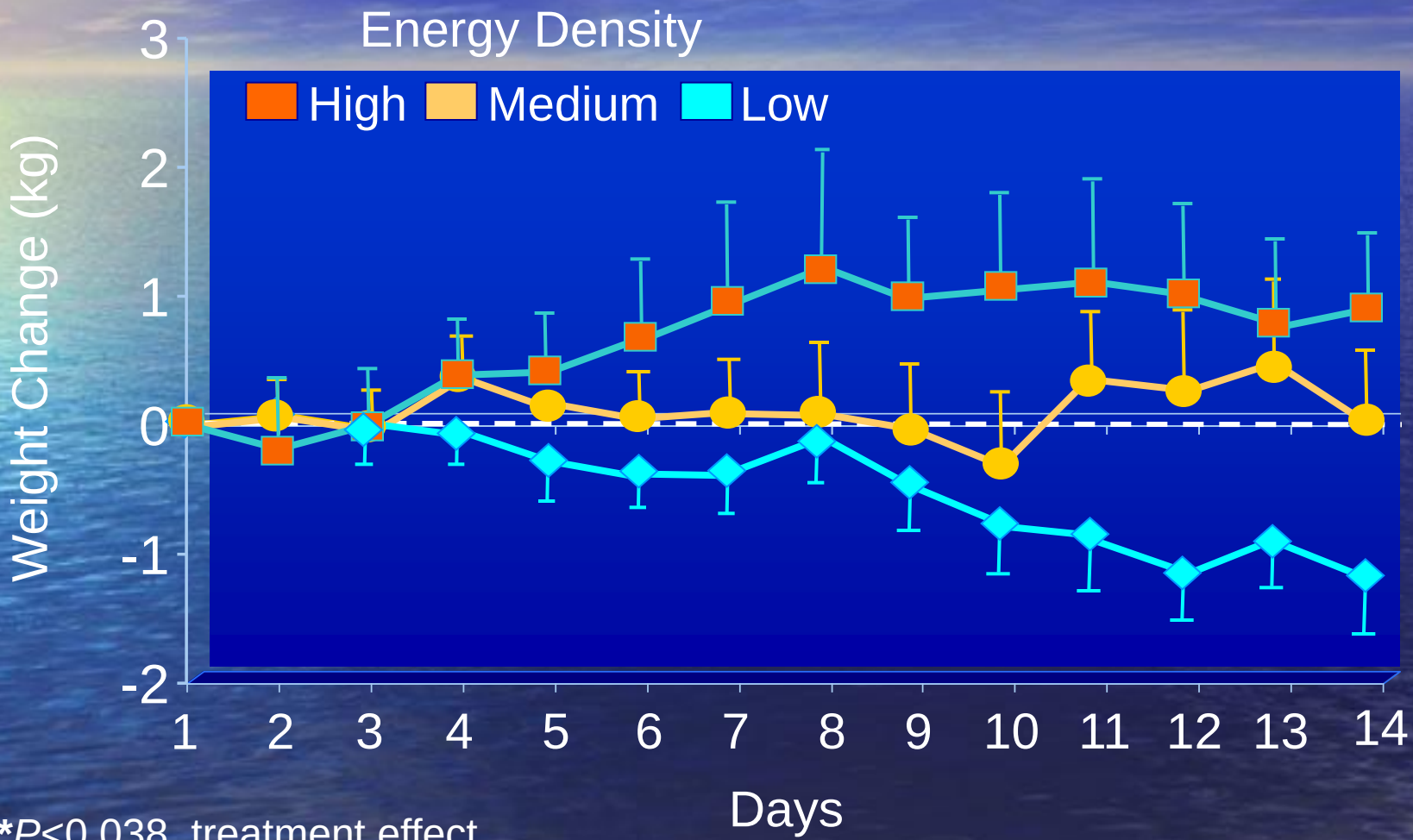
THE AMAZING NO-HUNGER WEIGHT-LOSS PLAN THAT HAS HELPED MILLIONS LOSE WEIGHT AND KEEP IT OFF
REVISED AND UPDATED

Ad Libitum Low-Fat Diets Decrease Daily Energy Intake



Astrup et al. *Int J Obes Relat Metab Disord* 2000;24:1545.

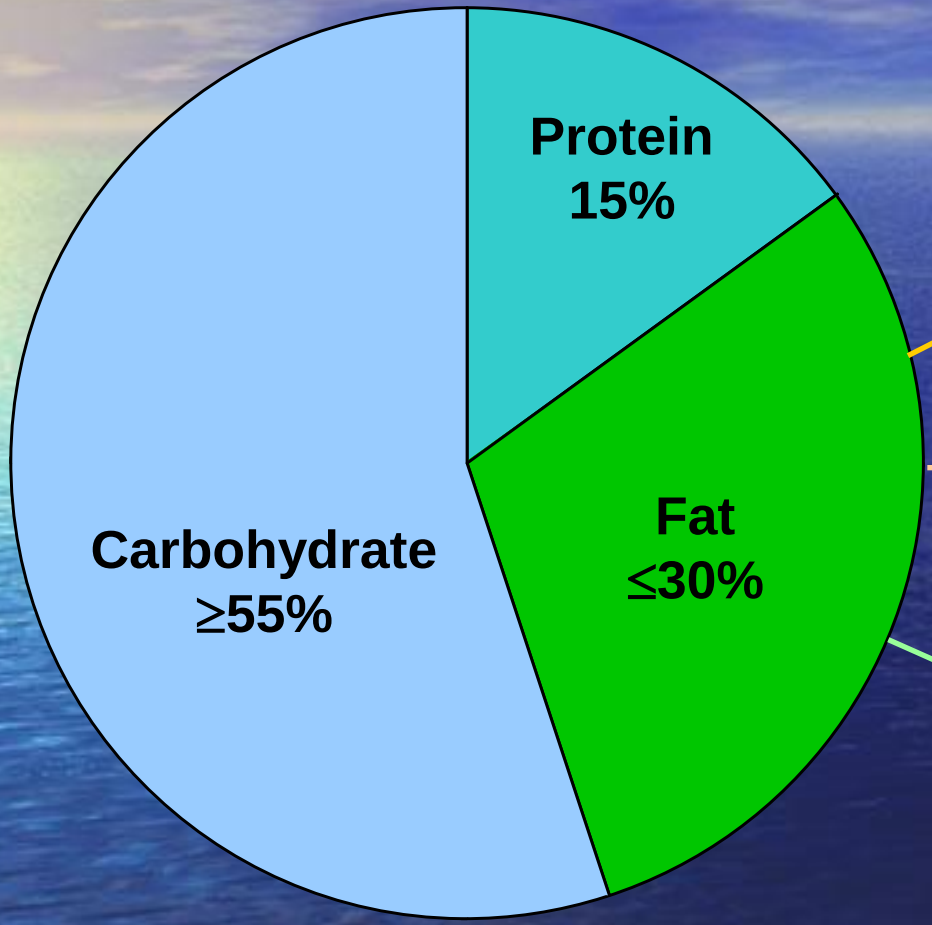
Diet Energy Density Influences Short-term Body Weight



*P<0.038, treatment effect.

Stubbs et al. *Int J Obes Relat Metab Disord.* 1998;22:980-7.

Recommended Nutrient Content of a Weight-Reducing Diet



8%-10% Saturated fatty acids

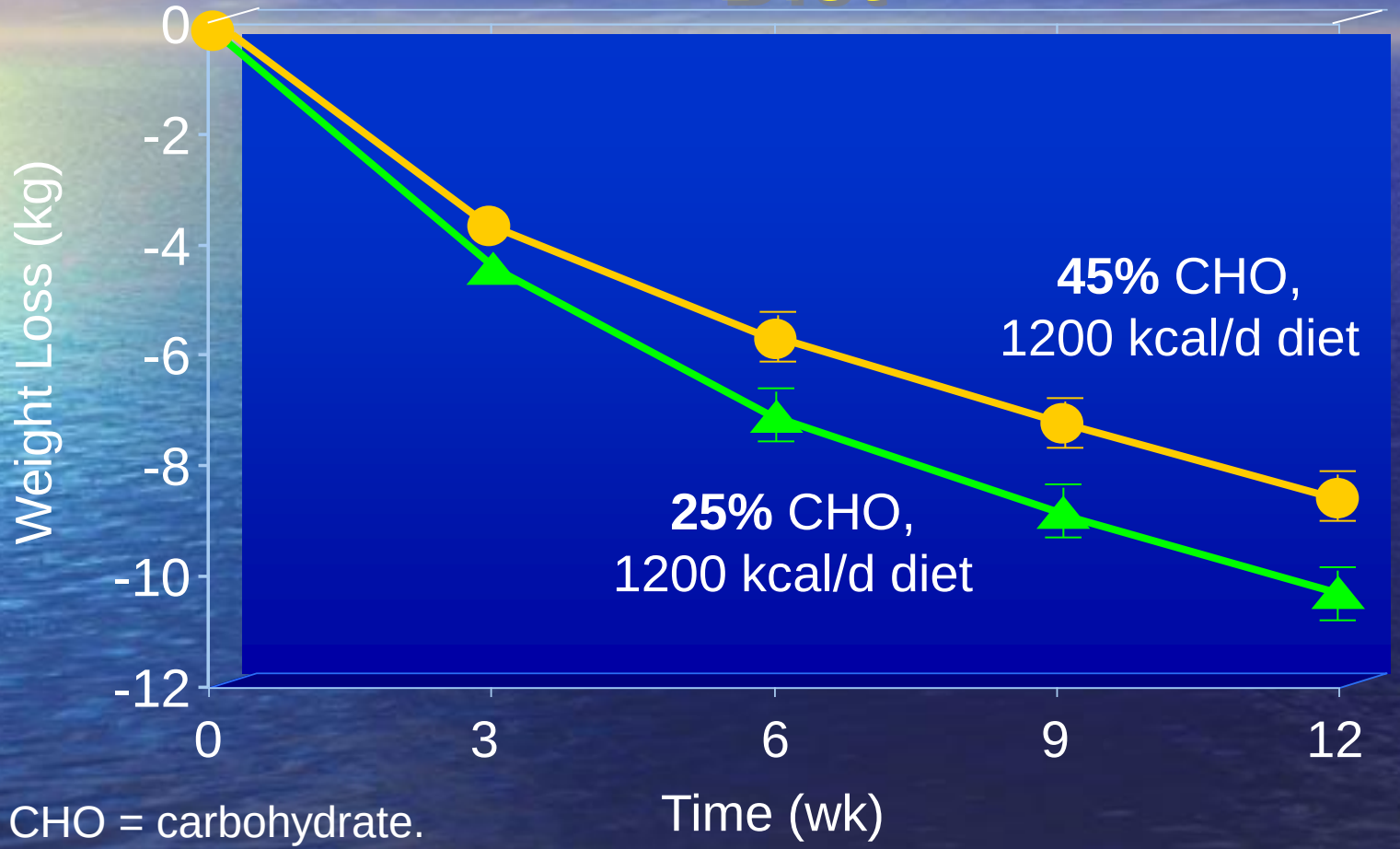
≤10% Polyunsaturated fatty acids

≤15% Monounsaturated fatty acids

Calories: 500-1000 kcal/d reduction
Cholesterol: <300 mg/d
Fiber: 20-30 g/d

Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults–The Evidence Report. *Obes Res.* 1998;6 (suppl 2).

Effect of Dietary Carbohydrate Manipulation with Fixed Low-Calorie Diet



CHO = carbohydrate.

Golay et al. *Int J Obes Relat Metab Disord* 1996;20:1067.

Weight Loss at 6-Months in RCTs of Low-fat vs Low-Carbohydrate Diets

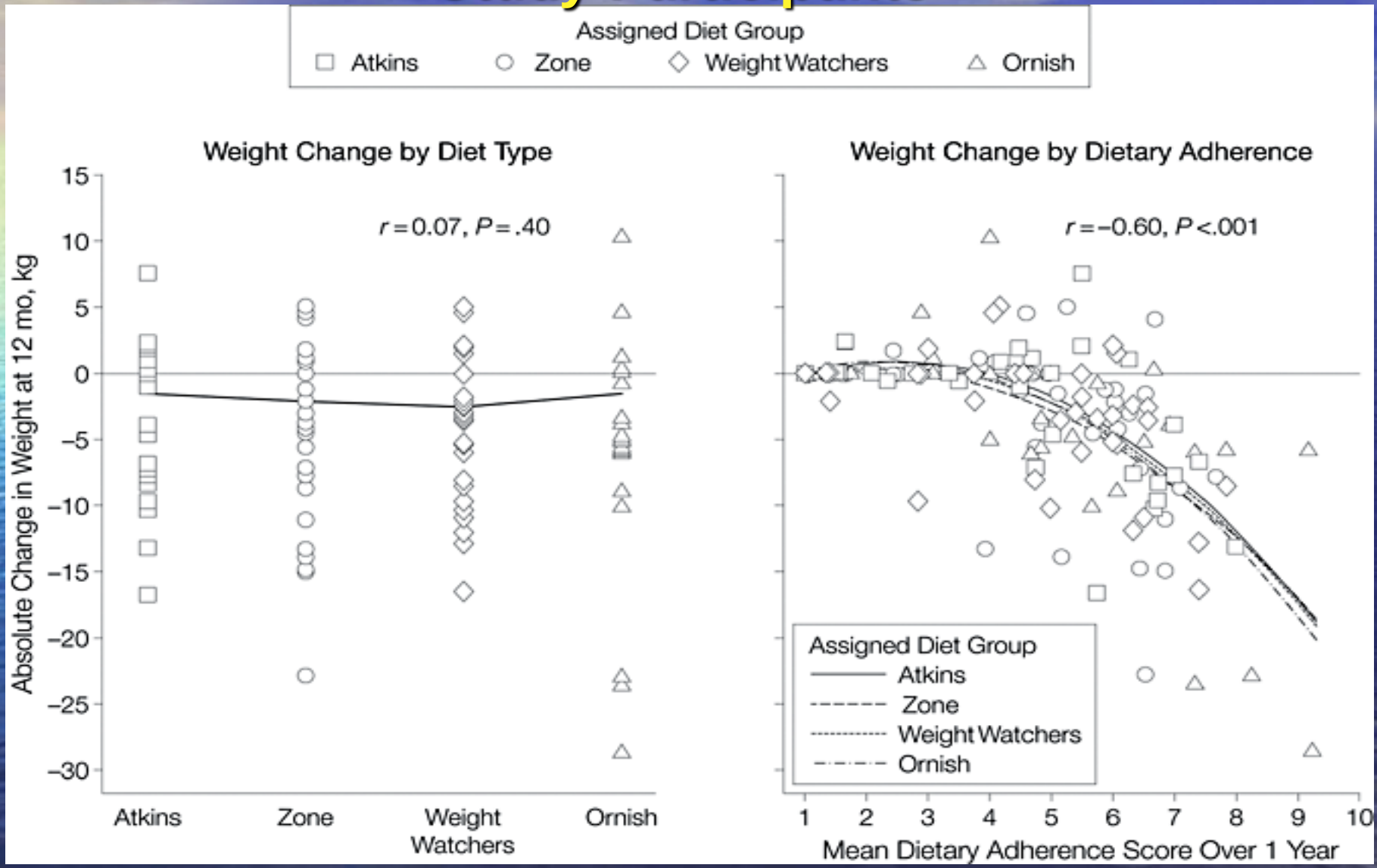
		Weight Loss (kg)		Difference
Study	n	Low-fat	Low-carb	(kg)
Samaha (2003)	132	-1.9	-5.8	3.9
Brehm (2003)	42	-3.9	-8.5	4.6
Foster (2003)	63	-5.3	-9.6	4.3
Yancy (2004)	120	-6.5	-12.0	5.5

RCT of the Atkins, Ornish, Weight Watchers, and Zone Diets for Weight Loss and Heart Disease Risk Reduction

- 160 overweight/obese participants: randomly assigned to 4 diet types.
- Outcomes: mean weight loss, changes in CVD risk factors, and adherence at 1 year
- Weight loss: associated with self-reported dietary adherence ($r = 0.60$; $P<.001$), but not with diet type.
- For each diet: decreasing levels of total/HDL cholesterol, CRP and insulin were significantly associated with weight loss with no significant difference between diets.

Dansinger JAMA 2005; 293:43-53

One-Year Changes in Body Weight as a Function of Diet Group and Dietary Adherence Level for All Study Participants

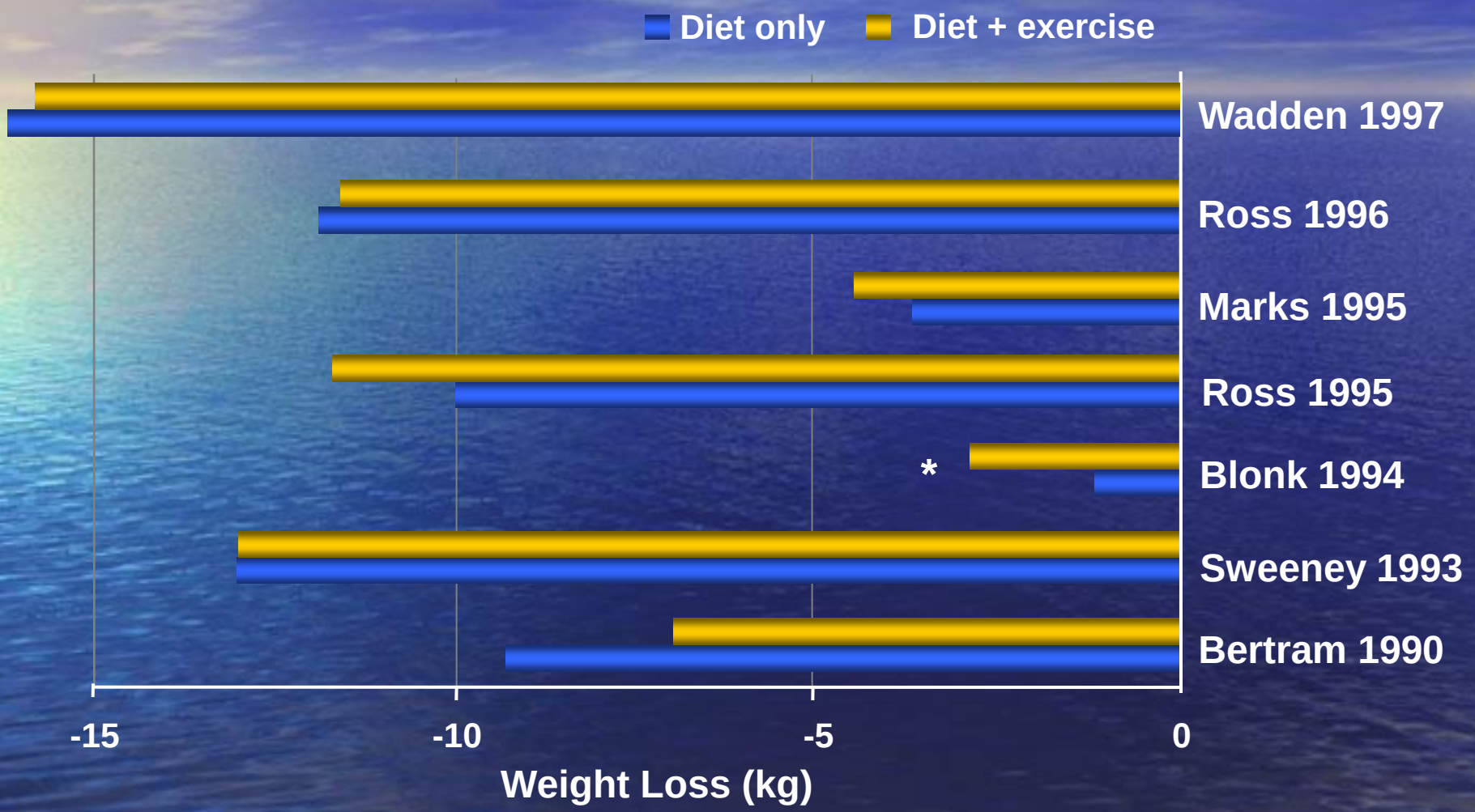


Dansinger, M. L. et al. JAMA 2005;293:43-53.

So how can we improve dietary adherence?

- Read food labels
- Self-monitor
- Minimize eating out
- Avoid getting overly hungry
- Meal replacements
- Smaller plates
- 5 servings of fruits and/or vegetables daily

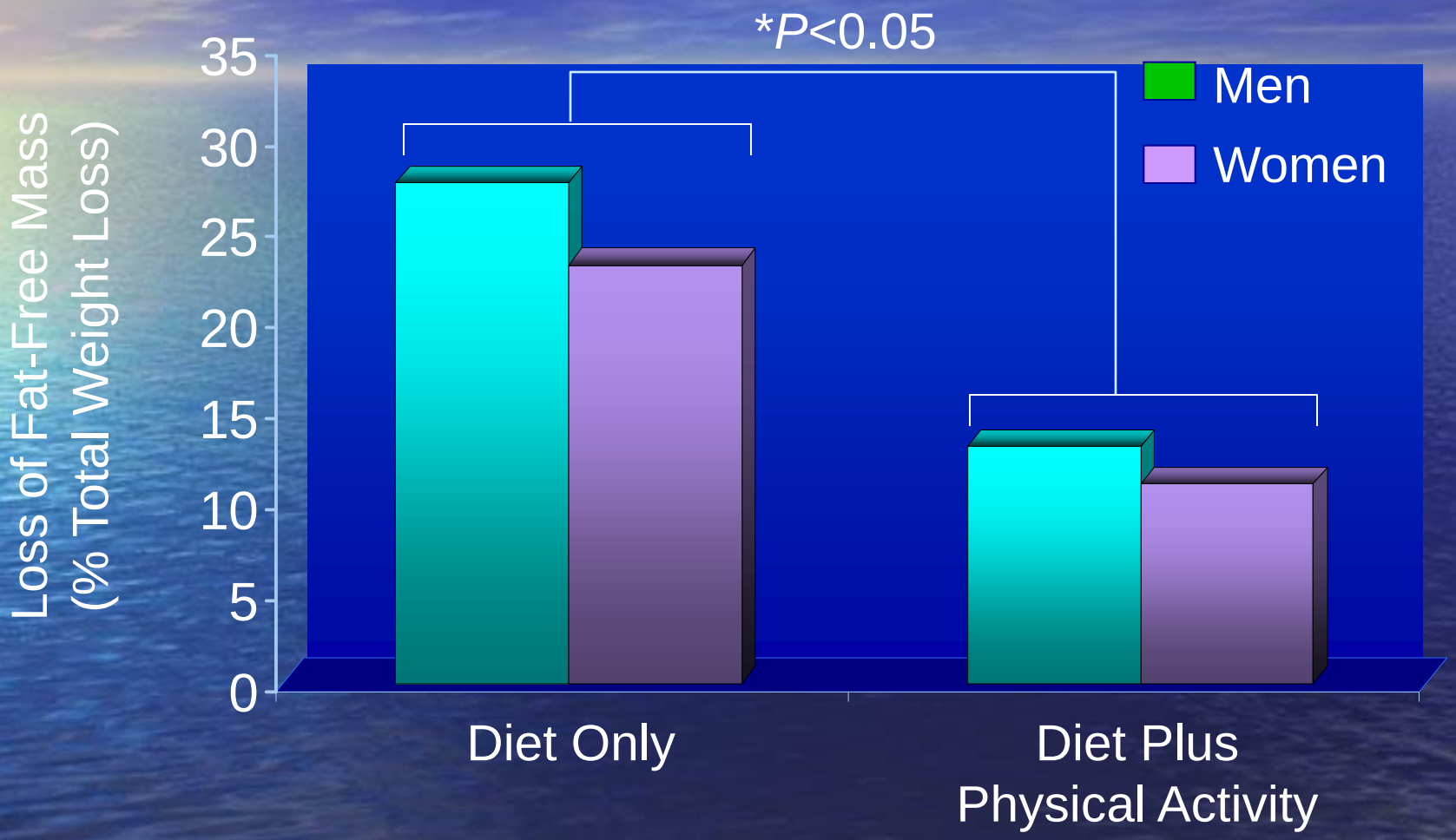
Physical Activity Usually Does Not Increase Short-Term Diet-Induced Weight Loss



Each study ranged from 4 to 6 months.
**P* < 0.05 vs diet-only group.

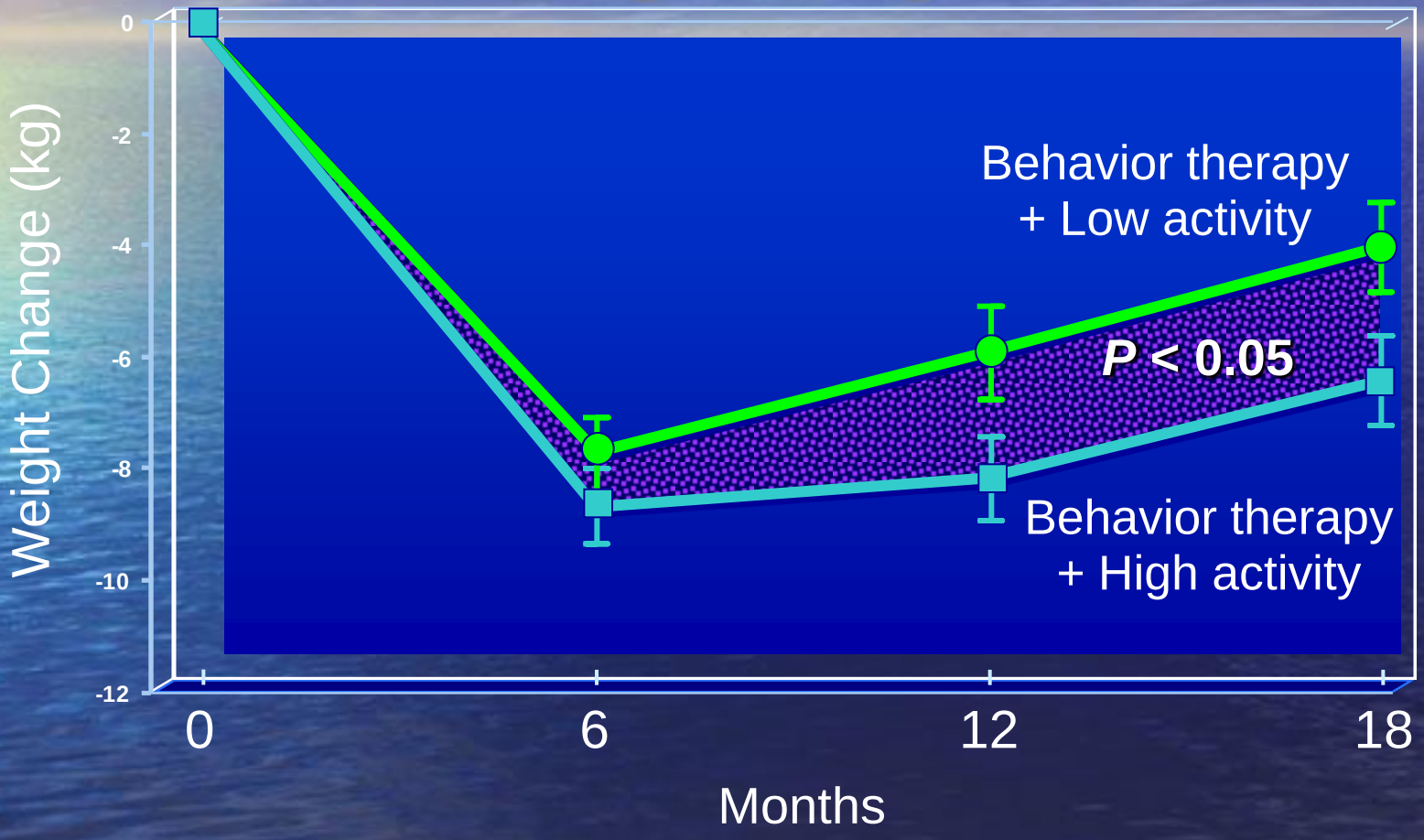
Wing. *Med Sci Sports Exerc.* 1999;31(suppl):S547.

Physical Activity Helps Preserve Fat-Free Mass During Weight Loss



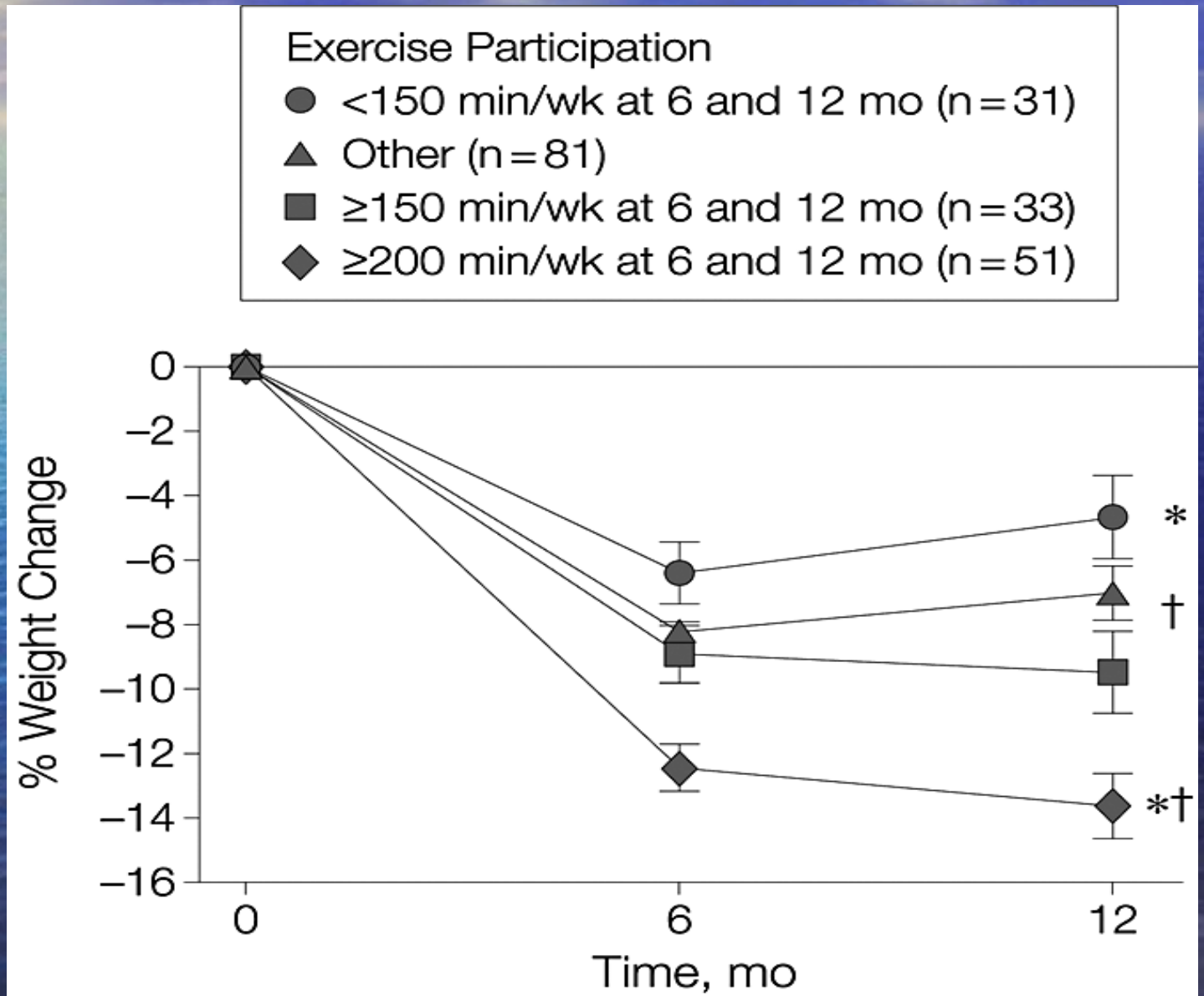
Ballor and Poehlman. *Int J Obes Relat Metab Disord* 1994;18:35.

Effect of Low-Activity (1000 kcal/wk) and High-Activity (2500 kcal/wk) on Weight Regain



Jeffery et al. Am J Clin Nutr 2003;78:684-689.

Every little bit counts!



21 min/day

25 min/day

29 min/day

Other Options for Obesity Prevention or Treatment

Medications

- Indicated at BMI of >30 kg/m^2, or 27 kg/m^2 with comorbidities
- Phentermine only prescription option

Surgery

- Indicated at BMI of >40 kg/m^2, or 35 kg/m^2 with comorbidities
- Efficacy related to degree of invasiveness

Can we prevent diabetes?

QuickTime™ and a
decompressor
are needed to see this picture.

Screening for pre-diabetes

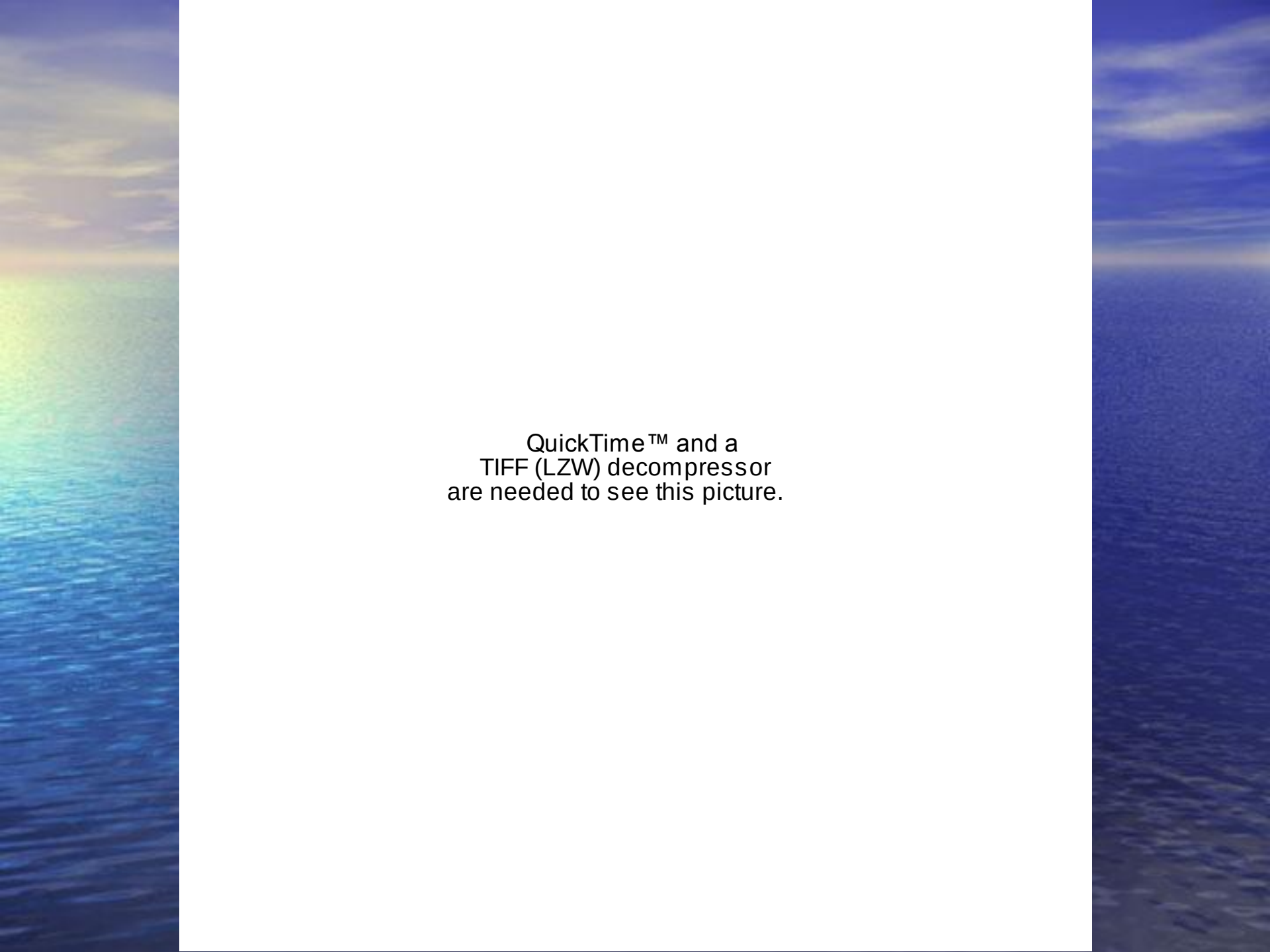
QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

Clinical Trials Using Lifestyle to Prevent Diabetes

Study:	N=	Follow-up (years)	Risk reduction
Da Qing	577	6.0	46%
India	531	2.5	28%
Japan	458	4.0	67%
DPS	522	2.8	58%
DPP	3234	3.2	58%

Clinical Trials Using Medication to Prevent Diabetes

Study:	Medication	Follow-up (years)	Risk reduction
DPP	metformin	3.2	31%
TRIPOD	troglitazone	2.5	56%
PIPOD	pioglitazone	3.5	62%
DREAM	rosiglitazone	3.0	60%
XENDOS	orlistat	4.0	45%
STOP-NIDDM	acarbose	3.3	28%


QuickTime™ and a
TIFF (LZW) decompressor
are needed to see this picture.

Standards of Care for People with Pre-diabetes

For those with IFG or IGT:

- Weight loss: 5-10%
- Exercise: moderate intensity 30 min/day

Standards of Care for People with Pre-diabetes

For those with IFG and IGT and:

<60 yo

BMI>35 kg/m^2

Family history of T2DM

High TG +/- low HDL

Hypertension

HbA1C>6%

- Weight loss: 5-10%
- Exercise: moderate intensity 30 min/day
- Metformin

Diagnosing Diabetes

>125 mg/dl	>200 mg/dl	≥6.5%
Fasting glucose	2h glucose or Symptoms	HbA1c

Results confirmed by 2nd test on a separate day

Diabetes:
Standards of Care

Euglycemia: HbA1C < 6.5-7.0%
Normotension: BP < 130/80 mmHg
Normal lipids: LDL < 70-100 mg/dl, TG <150 mg/dl, HDL > 40-50 mg/dl
Normal renal function: Cr < 1.4-1.5 mg/dl, Urine microalbumin/Cr <30 mg/g
Annual eye and foot exam

Effect of Glycemic Control in the UK Prospective Diabetes Study (UKPDS)

Endpoints	Intensive (rate/1000 pt yrs)	Conventional (rate/1000 pt yrs)	*P*	% Decrease
Any diabetes related*	40.9	46	0.029	11
MI	14.7	17.4	0.052	16
Stroke	5.6	5	0.52	–
PVD	1.1	1.6	0.15	–
Microvascular	8.6	11.4	0.0099	25

UKPDS Group. *Lancet.* 1998;352:837-853.

*Combined microvascular and macrovascular events

ACCORD, ADVANCE, & VA-DT

	N=	Intervention	Follow-up	Outcome
ACCORD	10,251 T2DM	Meds to HbA1C <6.0%	3.5 years	+22% death No Δ CVD
ADVANCE	11,140 T2DM	Meds to HbA1C <6.5%	5 years	-10% micro + CVD
VA-DT	1,791 T2DM	Meds to meet all ADA goals	6.25 years	No Δ CVD

Can we prevent CVD in diabetes?

UKPDS*: Order of Importance of CHD Risk Factors

Stepwise selection of risk factors, adjusted for age and sex, in 2693 white patients with diabetes, with dependent variable as time to first CHD event.

Variable	*P*-value
1. LDL-C	<0.0001
2. HDL-C	0.0001
3. HbA_{1c}	0.0022
4. Systolic BP	0.0065
5. Smoking	0.056

*United Kingdom Prospective Diabetes Study.

Turner RC et al. *BMJ.* 1998;316:823-828.

CHD Prevention Trials with Statins in T2DM: Subgroup Analyses

Study	Drug	No.	CHD Risk Reduction (overall)	CHD Risk Reduction (diabetes)
Primary Prevention				
AFCAPS/TexCAPS	Lovastatin	239	37%	43%
HPS	Simvastatin	5963	25%	22%
Secondary Prevention				
CARE	Pravastatin	586	23%	25%
4S	Simvastatin	202	32%	55%
LIPID	Pravastatin	782	25%	19%
4S-Extended	Simvastatin	483	32%	42%

Lipid Treatment Guidelines

Guidelines	Lipid targets in diabetes patients	Treatment recommendations
NCEP ATP III[1]	LDL-C <100 mg/dL (2.6 mmol/L) Optional LDL-C goal: <70 mg/dL (1.8 mmol/L)	Intensity of therapy should be sufficient to achieve a 30-40% reduction in LDL-C
ADA[2]	***Patients without CVD*** LDL-C <100 mg/dL (2.6 mmol/L) ***Patients with CVD*** Optional LDL-C goal: <70 mg/dL (1.8 mmol/L)	Age >40 years: Statin therapy to achieve LDL-C reduction of 30-40%, irrespective of baseline LDL-C All patients should be treated with a statin to achieve LDL-C reduction of 30-40%

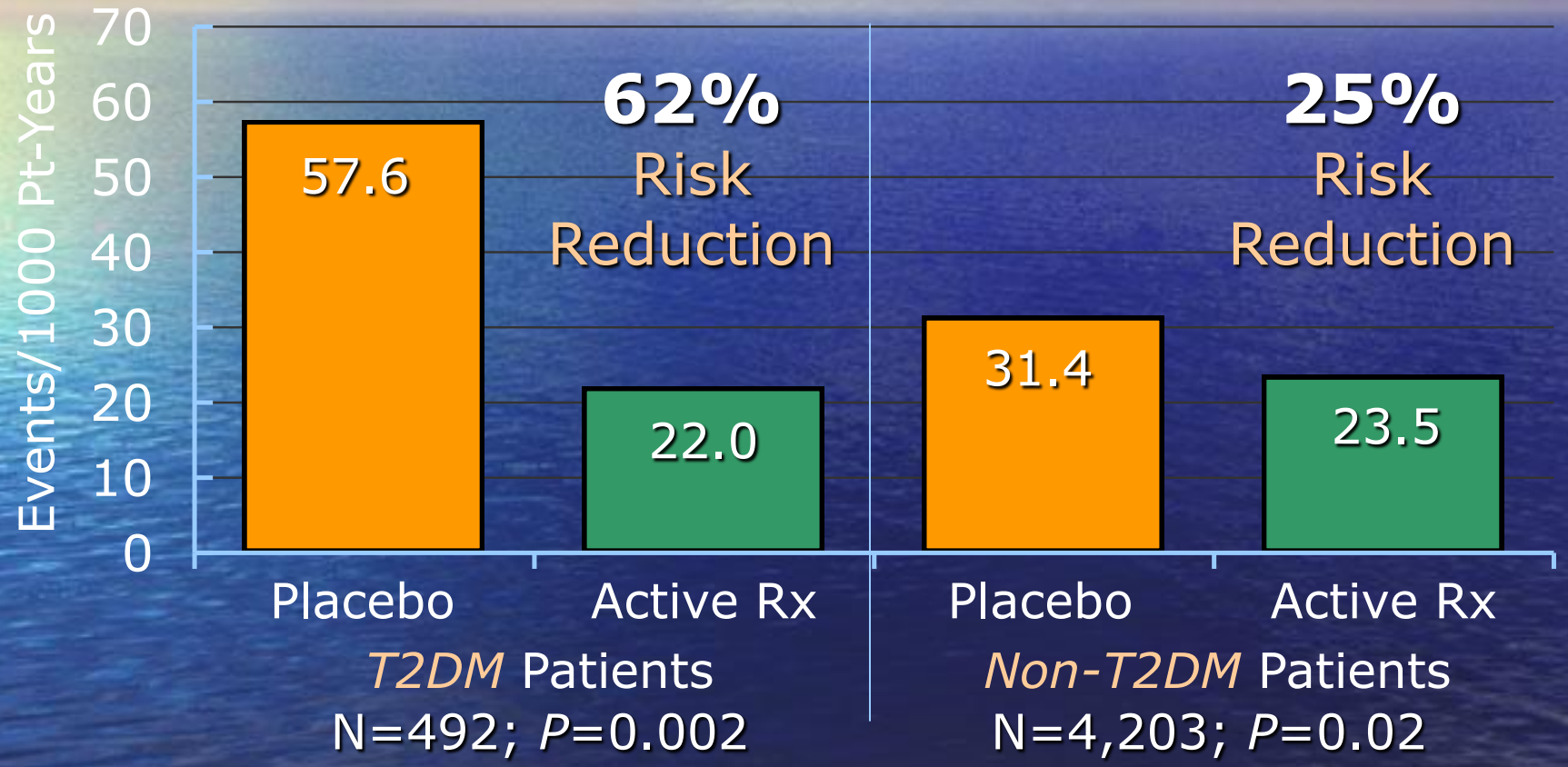
Comparison of Glucose Lowering and Blood Pressure Lowering in UKPDS

	Intensive Blood Glucose Control (n=2729)		Intensive Blood Pressure Control (n=758)	
	Reduction %	P Value	Reduction %	P Value
Any diabetes-related endpoint	12	0.029	24	0.0046
Myocardial infarction	16	0.052	21	NS
Stroke	11↑	NS	44	0.013
Microvascular disease	25	0.0099	37	0.092

↑ = Increase in risk

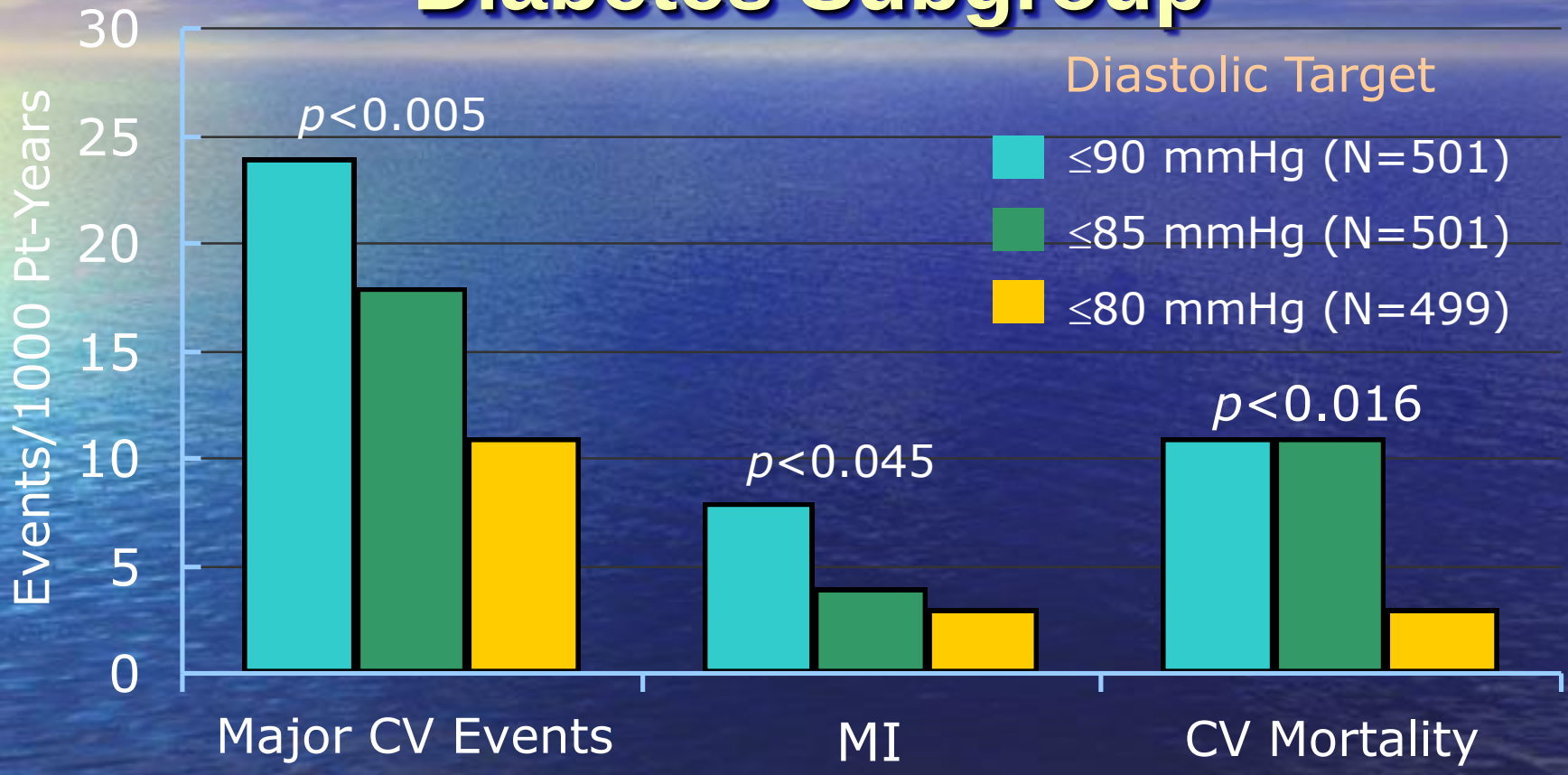
Adapted from UK Prospective Diabetes Study (UKPDS) Group. *Lancet* 1998;352:837-853; UK Prospective Diabetes Study Group. *BMJ* 1998;317:703-713.

Systolic Hypertension in Europe (Syst-Eur) Trial: Effect of Systolic BP Control on All Cardiovascular Events at 2 Years



Tuomilehto J, et al. *N Engl J Med.* 1999;340: 677-684.

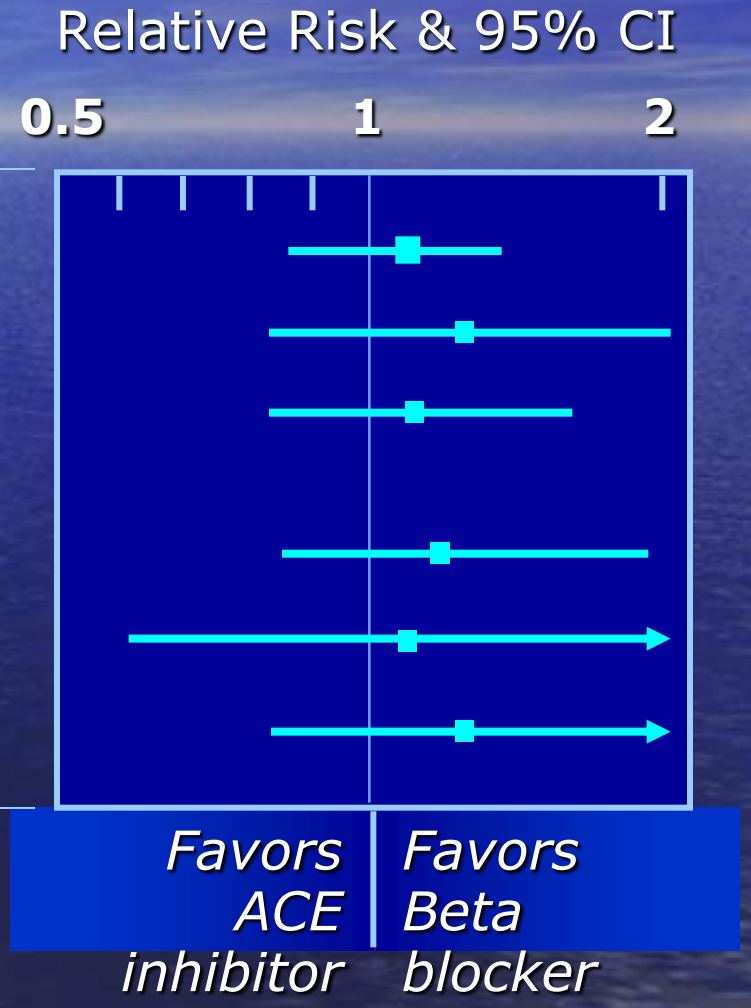
Major Outcomes of the Hypertension Optimal Treatment (HOT) Trial: Diabetes Subgroup



Hansson L, et al. *Lancet.* 1998;351: 1755-1762.

UKPDS: ACE Inhibitor vs. Beta-blocker for HTN: Aggregate Clinical Endpoints

	RR	p
Any diabetes-related endpoint	1.10	0.43
Diabetes-related deaths	1.27	0.28
All-cause mortality	1.14	0.44
Myocardial infarction	1.20	0.35
Stroke	1.12	0.74
Microvascular	1.29	0.30



UKPDS Group. *BMJ* 1998;317:713-720.

Take Home Messages:
Reducing Cardiometabolic Risk in Practice

- Prevent and treat obesity: diagnose, educate and encourage patients. Be specific with a treatment plan.
- Screen for diabetes. Lifestyle and medical therapies work to prevent diabetes.
- Lipid and BP lowering likely more important for CVD risk reduction in diabetes over the short term.